CLAIMS

What is claimed is:

1. A method of forming a complex between a prion protein and a prion protein binding material in a sample comprising contacting the sample with the prion protein binding material under conditions allowing formation of the complex between the prion protein and the prion protein binding material, wherein the prion binding material comprises a polymer matrix to which is bound a functional group, and wherein the functional group is a hydrophilic, a hydrophobic, or an amphiphilic functional group.

2. The method of Claim 1, further comprising detecting the complex.

3. The method of Claim 1, further comprising separating the complex from the sample.

4. The method of Claim 3, further comprising detecting the complex.

5. The method of Claim 1, wherein the functional group is a positively charged group, a negatively charged group or an uncharged group.

6. The method of Claim 1, wherein the functional group is an amine group, a sulfite group, a sulfonyl group, a tresyl group, an alkyl group, an aromatic group, a siloxane group, or a fluorinated group.

7. The method of Claim 6, wherein the aromatic group is a phenyl group.

8. The method of Claim 6, wherein the alkyl group is a butyl group.

9. The method of Claim 1, wherein the functional group is an amine group.

10. The method of Claim 9, wherein the amine group is a primary amine group, a secondary amine group, a tertiary amine group, or a quaternary amine group.

11. The method of Claim 10, wherein the quaternary amine group is a diethylaminoethyl group, a dimethylaminoethyl group or a trimethylaminoethyl group.

12. The method of Claim 1 wherein the functional group is selected from the group consisting of:

a) $-OCH_2-CHOH-CH_2NH_2$;

b) $-C_6H_5$;

c) $-(CH_2)_3-CH_3$;

d) $-CH_2-CH_2-N^+H(C_2H_5)_2$;

e) $-SO_2-CH_2-CF_3$;

f) $-CH_2-CH_2-N^+H(CH_3)_2$;

g) $-CH_2-CH_2-N^+(CH_3)_3$; and

h) $-SO_3^{2-}$.

13. The method of Claim 1 wherein the polymer matrix is a polymethacrylate or a methacrylate.

14. The method of Claim 1, wherein the polymer matrix is a FRACTOGEL™ EMD, a TOYOPEARL™, or a TSK-GEL™ polymer matrix.

15. The method of Claim 13, wherein the polymer matrix is TOYOPEARL™ AMINO 650.

16. The method of Claim 1 wherein the prion protein is PrPc, PrPsc, PrPr or PrPres.

17. The method of Claim 1, wherein the prion binding material is in a chromatography column, on a membrane, fiber, bead, impregnated into a non-woven mesh, coating a fiber, contained within a filter housing.

18. The method of Claim 1, wherein the sample is a biological sample, a food product, an environmental sample, or a water sample.

19. The method of Claim 18, wherein the biological sample is derived from a human or an animal.

20. The method of Claim 19, wherein the animal is a bovine, an ovine, a porcine, an equine, a murine or a *Cervidae* animal.

21. The method of Claim 1 wherein the prion protein is a human, bovine, ovine, porcine, equine, murine, or a *Cervidae* animal prion protein.

22. The method of Claim 18, wherein the biological sample is a blood-derived sample; a brain derived sample; a bodily fluid sample; a collagen extract; a gland extract, a tissue homogenate or extract.

23. The method of Claim 22, wherein the bodily fluid is blood, plasma, serum, cerebrospinal fluid, urine, saliva, milk, ductal fluid, tears, or semen.

24. The method of Claim 22, wherein the blood-derived sample is a platelet concentrate, a plasma protein preparation, an immunoglobulin preparation, a plasma fractionation intermediate, albumin preparation, a fibrinogen preparation, a factor XIII preparation, a thrombin preparation, a factor VIII preparation, a von Willebrand factor preparation, a protein C preparation, or an activated protein C preparation.

25. The method of Claim 1, wherein the sample is a pharmaceutical composition, a therapeutic composition, a cosmetic composition, food, or a nutritional supplement.

26. The method of Claim 18, wherein the biological sample is gelatin, jelly, milk or dairy product, collagen, or infant formula.

27. The method of Claim 18, wherein the biological sample comprises serum albumin.

28. The method of Claim 27, wherein the serum albumin is a human serum albumin or an animal serum albumin.

29. The method of Claim 27, wherein the sample comprises up to approximately 50% serum albumin by weight.

30. The method of Claim 27, wherein the sample comprises from approximately 5% to approximately 25% serum albumin by weight.

31. The method of Claim 1, wherein the prion protein binding material further comprises a spacer connecting the polymer matrix and the functional group.

32. The method of Claim 31, wherein the spacer is 20 atoms in length or less.

33. The method of Claim 31, wherein the spacer is 5 to 10 atoms in length.

34. A method of forming a complex between a prion protein and a prion protein binding material in a sample comprising contacting the sample with the prion protein binding material under conditions allowing formation of the complex between the prion protein and the prion protein binding material, wherein the prion binding material comprises aluminum or silica.

35. The method of Claim 34, further comprising detecting the complex.

36. The method of Claim 34, further comprising separating the complex from the sample.

37. The method of Claim 36, further comprising detecting the complex in the sample.

38. The method of Claim 34 wherein the prion protein is PrPc, PrPsc, PrPr or PrPres.

39. The method of Claim 1, wherein the prion binding material is in a chromatography column, on a membrane, fiber, bead, impregnated into a non-woven mesh, coating a fiber, contained within a filter housing.

40. The method of Claim 34, wherein the sample is a biological sample, a food product, an environmental sample, or a water sample.

41. The method of Claim 40, wherein the biological sample is derived from a human or an animal.

42. The method of Claim 41, wherein the animal is a bovine, an ovine, a porcine, an equine, a murine or a *Cervidae* animal.

43. The method of Claim 34, wherein the prion protein is a human, bovine, ovine, porcine, equine, murine, or a *Cervidae* animal prion protein.

44. The method of Claim 39, wherein the biological sample is a blood-derived sample; a brain derived sample; a bodily fluid sample; a collagen extract; a gland extract, a tissue homogenate or extract.

45. The method of Claim 44, wherein the bodily fluid is blood, plasma, serum, cerebrospinal fluid, urine, saliva, milk, ductal fluid, tears, or semen.

46. The method of Claim 44, wherein the blood-derived sample is a platelet concentrate, a plasma protein preparation, an immunoglobulin preparation, a plasma fractionation intermediate, albumin preparation, a fibrinogen preparation, a factor XIII preparation, a thrombin preparation, a factor VIII preparation, a von Willebrand factor preparation, a protein C preparation, or an activated protein C preparation.

47. The method of Claim 34, wherein the sample is a pharmaceutical composition, a therapeutic composition, a cosmetic composition, food or a nutritional supplement.

48. The method of Claim 39, wherein the biological sample is gelatin, jelly, milk or dairy product, collagen, or infant formula.

49. The method of Claim 39, wherein the biological sample comprises serum albumin.